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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Leino et al.  
Serial No.: 09/445,710  
Filed: 03/13/2000

Art Unit: 1731  
Examiner: Alvo, M

For: PROCESS FOR STABILIZING THE pH OF A PULP SUSPENSION AND FOR  
PRODUCING PAPER FROM THE STABILIZED PULP

DECLARATION UNDER 37 C.F.R. § 1.132

Honorable Commissioner of  
Patent and Trademarks  
Washington D.C. 20231

I, the undersigned ÖSTBERG, Gunilla, declare and state that:

1. I was part of an AGA team who performed CO<sub>2</sub> assisted pulp washing runs at AssiDomän Skärblacka mill in 1995. Said test runs are described in an article named "USE OF CARBON DIOXIDE IN THE PRODUCTION OF SULPHATE PULP", presented at the 5th International Conference on New Available Technique, The world Pulp and Paper Week, June 4-7, 1996. The article has been cited in the prosecution of U.S. Patent Application Ser. No. 09/445,710.
2. On pages 511 to 513 of the article we have described the production of bleached pulp in fiber line 1 of the fiber plant of the mill. The pulp was bleached after a so called oxygen delignification stage and then fed to the paper mill.
3. The charge of alkali mentioned on pages 512 and 513 of the article refers to said oxygen delignification stage. The "charge of alkali" comprises alkali added with oxygen to the reactor. The added alkali is a reagent required for and consumed in the delignification operation.
4. The alkali charge to the oxygen delignification was not combined with a feeding of CO<sub>2</sub> and it could not have been so combined since it is not possible to add CO<sub>2</sub> to an oxygen delignification step.
5. The delignified pulp was washed after the delignification stage. The article describes that prior to starting the test runs with CO<sub>2</sub> the charge of alkali to the delignification stage was limited by the poor washing result in the ultrawashers. When the CO<sub>2</sub> tests were started, the washing result improved since the pH was decreased by CO<sub>2</sub>. Consequently, the charge of alkali to the delignification stage could be increased and a higher delignification was provided

without disturbing the washing performance.

6. The washing of the delignified pulp was improved by the lowered pH achieved with  $\text{CO}_2$ . No NaOH was added in combination with the  $\text{CO}_2$  nor would anyone have thought of doing so since the need was to lower the pH and NaOH has the opposite effect.
7. Fig. 3 of on page 513 of the article shows that when a larger amount of alkali was fed with the oxygen into the delignification stage, an improved reduction in kappa number was obtained. This was a desirable result, but it also led to poor washing results which kept the alkali charge of the old "reference" runs down. When the mill started to wash with  $\text{CO}_2$ , the alkali charge to the delignification stage could be increased since the  $\text{CO}_2$  operated as an acid in the subsequent washing.
8. In fiber line 1 the alkali was charged as a delignification chemical and the  $\text{CO}_2$  provided a pH-adjustment after the delignification. There was no question of adding the two chemicals in combination or in amounts higher than required for each respective pH adjustment to the pulp. Both chemicals were added in the fiber line for providing the pH adjustments required by the respective addition and in order to improve the operations in the fiber plant of the mill.
9. No corresponding operations were done nor could have been done to the pulp in the stock preparation of the paper plant of the mill since there is neither delignification nor washing in the stock preparation.
10. On pages 513 to 515, the article describes the production of unbleached pulp in fiber line 2. The mill was using alkali (NaOH) now and then to adjust the pH of its unbleached pulp produced in fiber line 2 before the test runs with  $\text{CO}_2$  washing were started. This was done in order to control the pH for optimizing the refining.
11. When the test runs with  $\text{CO}_2$  in the fiber line 2 washing started, the pH of the unbleached pulp was seen to be in control without alkali. Due to the  $\text{CO}_2$  washing the pH of the pulp was about pH 8, which was very good for the subsequent refining.
12.  $\text{CO}_2$  has an inherent buffering capacity as described on page 509 of the article. This inherent buffering capacity provided an improved stability in the unbleached pulp and when the pH was stable at about 8 there was no need for a pH adjustment by NaOH.
13. We noted an increased stability in the unbleached pulp and considered that this was due to the inherent buffering effect of  $\text{CO}_2$ , as described on page 515. We never added a combination of  $\text{CO}_2$  and NaOH to the pulp. Whenever  $\text{CO}_2$  or NaOH was used, it was used respectively as a separate chemical in the process, each one for its own pH adjustment. The addition point of NaOH was about 10 to 24 hours downstream of the  $\text{CO}_2$  addition point.
14. It never occurred to us that we could have enhanced the inherent positive effect caused by the  $\text{CO}_2$  washing. We never contemplated actively increasing the bicarbonate level far above that obtainable with the mere addition of  $\text{CO}_2$ , as is done in U.S. Patent Application Ser. No. 09/445,710. In actual fact, we only observed that the  $\text{CO}_2$  washing had a beneficial effect on the stability of the pH in the paper plant.
15. We did not add any  $\text{CO}_2$  to the pulp in the stock preparation. Our aim was only to improve the washing in the fiber plant. Since no washing is done in the stock preparation of the paper plant, there was never any thought of adding the wash-improver  $\text{CO}_2$  in the paper plant.

16. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that all these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed in Stockholm, Sweden, on December 20, 2002



Gunilla Östberg